AN 08-30CRN1-2
A.P. NO. 2273A

HANDBOOK OF OPERATING INSTRUCTIONS

for

RADIO TRANSMITTING EQUIPMENT

AN/CRN-1

RESTRICTED

(For Official Use Only)

Approved 14 JANUARY 1944

RADIO TRANSMITTING EQUIPMENT AN/CRN-1

INSTRUCTION MANUAL REVISIONS

Instruction manual revisions together with the paragraphs effected are given below:

1. PARAGRAPH 1b, of SECTION I, change last line to read as follows:

   "transmitter to sink after approximately 100 to 150 hours in the water."

2. PARAGRAPH 5a, of SECTION I, page 2, line 5, change to read as follows:

   "For test purposes a cable, having both a 5 prong and"

   Line 8, change to read as follows:

   "tuning purposes there is at the top of the cabinet and insulator"

   Line 9, change to read as follows:

   "and a 5-1/2" bare wire conductor provided with a plug"

3. PARAGRAPH 5b, of SECTION I, page 2, change to read as follows:

   "a standard 1/4" hex-nut socket wrench is provided with each Test Set. This wrench is to be used for tuning the grid and antenna circuits of the transmitter."

4. PARAGRAPH 2b, of SECTION II, page 4, should read as follows:

   "Remove cardboard filler and round wood spacer from inner case. Remove the bag of Silica Gel from the nose of the inner case. Discard this bag."

5. PARAGRAPH 2f, of SECTION II, page 4, DELETE ENTIRELY.

6. PARAGRAPH 2j, of SECTION II, page 5, should read as follows:

   "An airtight envelope containing a bag of Silica Gel is packed with the operating spare parts. Remove the bag of Silica Gel from the airtight container and lay it in the bottom of the inner case nose.

6. PARAGRAPH 2j, of SECTION II, page 5 (CONTINUED)

IMMEDIATELY replace the nose on the inner case. Use the nose tool and tighten the nose with considerable force until the gasket is definitely depressed. Slide the inner case up and replace the float cord bracket and the nose on the outer case.

7. PARAGRAPH 3, SECTION II, page 5.

DELETE second sentence of the "CAUTION" paragraph beginning with "Take care not to--"

8. PARAGRAPH 3a, of SECTION II, DELETE steps (1) thru (5) on pages 5 and 6. Replace with the following:

A. PROCEDURE

(1) Remove both the test stand and test unit from the wooden field cases.

(2) Assemble the test stand. Fasten the test set to the stand with the two wing nuts located on the underside of the base provided for the Test Set.

(3) Lift the hinged bar and place the transmitter in the test stand. Position the transmitter so that the tuning controls face the front of the test stand.

(4) Clip the test stand ground lead to the two studs at the top of the transmitter case that mount the float cord bracket. (See Fig. 6 for exact location).

(5) Remove the rubber finger stall cap (not shown in sketch) from the collapsed antenna and the retaining ring.

Raise the largest antenna section to full length and secure by sharply pulling the antenna upwards thru the last 6" of travel. This will insure good electrical contact with the fixed portion of the antenna and will also prevent the upper section from falling down during test.

8. PARAGRAPH 3a, of SECTION II

(5) Continued

CAUTION: Do not force the antenna too firmly when it is pulled up, or it will be impossible to lower the antenna at the end of the test.

(6) Mount the Antenna Tuning Hood on the transmitter by lowering the Hood straight down over the extended antenna section. Make certain it is properly seated over the insulator.

Face the jack at the lower end of the Antenna Tuning Hood towards the Test Set.

(7) At the top of the Test Set is a 5-1/2" bare wire lead terminated with a banana plug. Insert this plug into the jack on the Antenna Tuning Hood.

(8) Loosen the two thumbscrews at the top of the transmitter and remove the control knob cover.

(9) Connect the five prong plug and the single prong high voltage plug on the Test Set cable, to the sockets on the top of the transmitter case. (See Fig. 8)

9. PARAGRAPH 3a, (d), SECTION II, page 6, should read as follows:

"B-Battery Current - Turn the INDICATOR SW. to the IP position. The "B" battery current will now be indicated on the meter and should be approximately 24 ma. (See Table I). This reading is approximately 10% higher than the actual "B" current under normal operating conditions. This is due to a resistance inside the Test Set that is in series with the resonant antenna circuit."

10. PARAGRAPH 3f, SECTION II, page 6, after first paragraph, add the following in place of paragraph "CAUTION" and paragraph (2)

(2) Procedure for Tuning Transmitter

a. Precautions

The Test Set TS-41/CRN-1 may be used to adjust the transmitter tuned circuits to any desired frequency from 1400 to 1750 Kc. The following precautions are to be observed when tuning the transmitter.

1. Do not allow the transmitter to operate for more than a minute or so with the grid and antenna circuits out of resonance. Under this condition, the oscillator tube draws a heavy current, approximately 35 or 45 MA, and will cause rapid discharge of the battery pack.

2. Do not operate the transmitter for more than a minute or so with the H.V. Switch in the Test position, as the constant current will shorten the life of the battery pack.

3. All preliminary tuning should be done with the H.V. Switch in the Key position. The switch should be turned to the Test position only for fine adjustments.

   NOTE: The meter pointer will fluctuate when the H.V. Switch is in the Keying position, except when Selector Switch is in IP position. To resonate the transmitter circuits and the frequency control on the Test Set, tune for minimum pointer swing.

b. Minor Adjustment

The procedure to follow for tuning the transmitter will be dependent upon existing conditions, for example: If the grid circuit is tuned close to the desired frequency and the antenna circuit needs only slight adjustments to resonate it at the same frequency, the procedure is as follows:

Connect the Test Set to the transmitter as mentioned in previous paragraphs. Turn the Fil. Switch to the ON position, the H.V. Switch to the Test position and the Indicator Switch to the FREQ. position. Turn the Frequency control to the desired frequency. Use the quarter inch spintite wrench provided with the Test Set and adjust the antenna and grid controls for maximum dip of the meter pointer.

c. Large Frequency Change

Should existing conditions necessitate tuning the transmitter from one end of the frequency range to the other, it will be necessary to do this in several steps. The procedure is as follows:

Connect the Test Set to the transmitter as previously explained and turn the Fil. Switch to ON and the H.V. Switch to the Key position. Turn the Indicator Switch to the FREQ. position and adjust the Frequency control for minimum swing of the meter pointer. (The meter pointer will be found to fluctuate when the H.V. Switch is in the Keying position.

Detune the frequency control in the direction of the desired frequency change until the meter is nearly off frequency indication, that is, until the pointer almost reaches maximum swing. Leave the frequency control in this position and with the spintite wrench adjust the transmitter grid and antenna controls for minimum swing of the meter pointer.

Again detune the frequency control in the direction of the frequency change as above, that is, to a point just before maximum swing of the pointer. As above, resonate the grid and antenna circuits at this frequency.

Continue this procedure until the approximate desired frequency is reached. Turn the H.V. Switch to the Test position and adjust the grid and antenna controls accurately for maximum dip of the meter.

This procedure must be followed whenever the desired frequency change is sufficient to cause tuning the frequency meter beyond the point where maximum deflection of the meter pointer is obtained. If this is not done, it will be impossible to determine when the grid circuit is resonated at the frequency indicated by the Frequency control. This is because the transmitter output is insufficient to actuate the meter when the grid and antenna circuits are out of resonance. See following paragraph.

d. Determination of Grid Circuit Frequency

If the grid and antenna circuits are not tuned close to the same frequency, it will be impossible to determine the frequency of the grid circuit by means of the Frequency dial on the Test Set. This is because the transmitter output under this condition is not sufficient to cause a dip of the indicator meter. If this condition exists, it will be necessary to determine the frequency of the grid circuit before the tuned circuits may be adjusted accurately. This may be done by either of the two following procedures:

1. Turn the Test Set Fil. Switch to ON and the H.V. Switch to Key. If an accurately calibrated receiver is available, tune it through the frequency range of 1400 to 1750 KC. The signal of the transmitter will be found at some point in this range and may be identified by means of the code letter that the mechanism is adjusted to transmit.

2. If a receiver is not available, turn the Indicator Switch to the IP position and note the "B" current. This should be about 35 or 40 MA.

   Use the spintite wrench and adjust the antenna control until a point is found where minimum current is indicated by the meter. This minimum current should be in the neighborhood of 25 MA. The antenna and plate circuits are now resonated at the same frequency.

   The frequency of the transmitter may now be checked by means of the Test Set Frequency dial. To do this, turn the Indicator Switch to the FREQ. position. Adjust the Frequency control for minimum meter swing. Turn the H.V. Switch to Test. Readjust the Frequency control for minimum deflection of the meter pointer. Turn the H.V. Switch back to Key. The frequency of the transmitter may now be determined by means of the setting of the Frequency control and the calibration chart on the top of the cabinet.

   Further adjustments will depend upon existing conditions and are to be made as described in either paragraphs (2)b, or (2)c on preceding pages.

11. PARAGRAPH 4, SECTION II, under heading WARNING, page 8, add the following:

"Make certain that the red covered cord on the parachute pack is attached to the loop that protrudes from the red nut on the top of the transmitter. Likewise, make certain that the small black cord protruding from the side of the parachute pack, is attached to the loop through the black float cord bracket at the side of the transmitter cases."

ILLUSTRATION REVISIONS

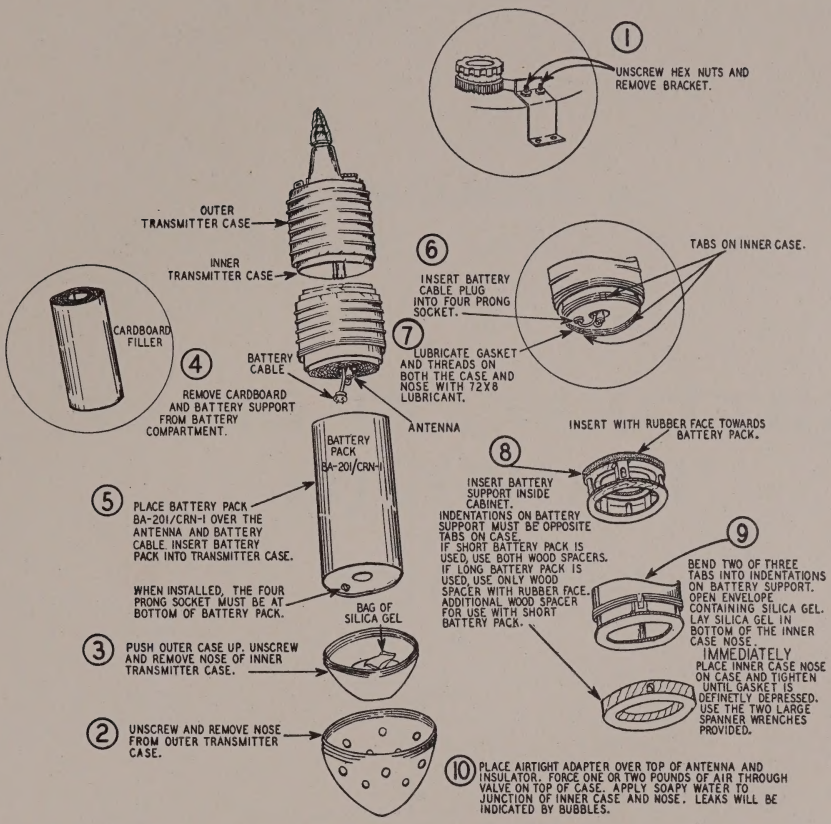
1
UNSCREW HEX NUTS AND REMOVE BRACKET.
OUTER TRANSMITTER CASE
INNER TRANSMITTER CASE
CARDBOARD FILLER
4
BATTERY CABLE
REMOVE CARDBOARD AND BATTERY SUPPORT FROM BATTERY COMPARTMENT.
6
INSERT BATTERY CABLE PLUG INTO FOUR PRONG SOCKET.
TABS ON INNER CASE.
7
LUBRICATE GASKET AND THREADS ON BOTH THE CASE AND NOSE WITH 72X8 LUBRICANT.
ANTENNA
BATTERY PACK BA-201/CRN-1
5
PLACE BATTERY PACK BA-201/CRN-1 OVER THE ANTENNA AND BATTERY CABLE. INSERT BATTERY PACK INTO TRANSMITTER CASE.
WHEN INSTALLED, THE FOUR PRONG SOCKET MUST BE AT BOTTOM OF BATTERY PACK.
INSERT WITH RUBBER FACE TOWARDS BATTERY PACK.
8
INSERT BATTERY SUPPORT INSIDE CABINET.
INDENTATIONS ON BATTERY SUPPORT MUST BE OPPOSITE TABS ON CASE.
IF SHORT BATTERY PACK IS USED, USE BOTH WOOD SPACERS.
IF LONG BATTERY PACK IS USED, USE ONLY WOOD SPACER WITH RUBBER FACE.
ADDITIONAL WOOD SPACER FOR USE WITH SHORT BATTERY PACK.
9
BEND TWO OF THREE TABS INTO INDENTATIONS ON BATTERY SUPPORT.
OPEN ENVELOPE CONTAINING SILICA GEL. LAY SILICA GEL IN BOTTOM OF THE INNER CASE NOSE.
IMMEDIATELY PLACE INNER CASE NOSE ON CASE AND TIGHTEN UNTIL GASKET IS DEFINETLY DEPRESSED. USE THE TWO LARGE SPANNER WRENCHES PROVIDED.
BAG OF SILICA GEL
3
PUSH OUTER CASE UP. UNSCREW AND REMOVE NOSE OF INNER TRANSMITTER CASE.
2
UNSCREW AND REMOVE NOSE FROM OUTER TRANSMITTER CASE.
10
PLACE AIRTIGHT ADAPTER OVER TOP OF ANTENNA AND INSULATOR. FORCE ONE OR TWO POUNDS OF AIR THROUGH VALVE ON TOP OF CASE. APPLY SOAPY WATER TO JUNCTION OF INNER CASE AND NOSE. LEAKS WILL BE INDICATED BY BUBBLES.

FIG. 5, BATTERY PACK BA-201/CRN-1, INSTALLATION, (REVISED)

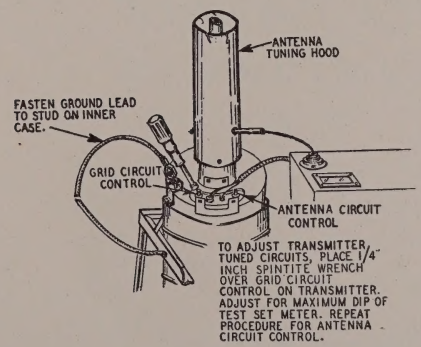
ANTENNA TUNING HOOD
FASTEN GROUND LEAD TO STUD ON INNER CASE.
GRID CIRCUIT CONTROL
ANTENNA CIRCUIT CONTROL
TO ADJUST TRANSMITTER TUNED CIRCUITS, PLACE 1/4 INCH SPINTITE WRENCH OVER GRID CIRCUIT CONTROL ON TRANSMITTER. ADJUST FOR MAXIMUM DIP OF TEST SET METER. REPEAT PROCEDURE FOR ANTENNA CIRCUIT CONTROL.

FIG. 6, USE OF TUNING SHAFT (REVISED)

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LIST OF REVISED PAGES ISSUED

NOTE: A heavy black vertical line, to the left of the text on revised pages, indicates the extent of the revision. This line is omitted where more than 50 percent of the page is revised.

This issue contains no revisions.

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Destruction of Abandoned Materiel in the Combat Zone

In case it should become necessary to prevent the capture of this equipment and when ordered to do so, DESTROY IT SO THAT NO PART OF IT CAN BE SALVAGED, RECOGNIZED, OR USED BY THE ENEMY. BURN ALL PAPERS AND BOOKS.

Means:-

1. Explosives, when provided.
2. Hammers, axes, sledges, machetes, or whatever heavy object is readily available.
3. Burning by means of incendiaries such as gasoline, oil, paper, or wood.
4. Grenades and shots from available arms.
5. Burying all debris or disposing of it in streams or other bodies of water, where possible and when time permits.

Procedure:-

1. Obliterate all identifying marks. Destroy nameplates and circuit labels.
2. Demolish all panels, castings, switch- and instrument-boards.
3. Destroy all controls, switches, relays, connections, and meters.
4. Rip out all wiring and cut interconnections of electrical equipment. Smash gas, oil, and water-cooling systems in gas-engine generators, etc.
5. Smash every electrical or mechanical part, whether rotating, moving, or fixed.
6. Break up all operating instruments such as keys, phones, microphones, etc.
7. Destroy all classes of carrying cases, straps, containers, etc.
8. Bury or scatter all debris.

DESTROY EVERYTHING!

★

Unsatisfactory Report

For U. S. Army Air Force Personnel:

In the event of malfunctioning, unsatisfactory design, or unsatisfactory installation of any of the component units of this equipment, or if the material contained in this book is considered inadequate or erroneous, an Unsatisfactory Report, AAF Form No. 54, or a report in similar form, shall be submitted in accordance with the provisions of Army Air Force Regulation No. 15-54, listing:

1. Station and organization.
2. Nameplate data (type number or complete nomenclature if nameplate is not attached to the equipment).
3. Date and nature of failure.
4. Airplane model and serial number.
5. Remedy used or proposed to prevent recurrence.
6. Handbook errors or inadequacies, if applicable.

For U. S. Navy Personnel:

Report of failure of any part of this equipment during its guaranteed life shall be made on Form N. Aer. 4112, "Report of Unsatisfactory or Defective Material," or a report in similar form, and forwarded in accordance with the latest instructions of the Bureau of Aeronautics. In addition to other distribution required, one copy shall be furnished to the inspector of Naval Materiel (location to be specified) and the Bureau of Ships. Such reports of failure shall include:

1. Reporting activity.
2. Nameplate data.
3. Date placed in service.
4. Part which failed.
5. Nature and cause of failure.
6. Replacement needed (yes—no).
7. Remedy used or proposed to prevent recurrence.

For British Personnel:

Form 1022 procedure shall be used when reporting failure of radio equipment.

SAFETY NOTICE

Operation of this equipment involves the use of high voltages which are dangerous to life (675 volts d-c). Personnel must observe proper precautions and safety regulations at all times.

To insure safety, observe the following:

1. Keep away from the antenna end of the equipment at all times. Accidental discharge of the antenna may cause serious injury.

2. Do not pull the red pull-switch loop. This loop connects to the switch that turns on the timing mechanism and discharges the antenna.

3. If switch is accidentally pulled, keep away from the antenna end of the equipment. Push switch plunger down by inserting any small object in the hole through which the switch loop passes.

4. Do not hold the static cord when dropping the equipment from the bottom hatch of the aircraft.

SECTION I
GENERAL DESCRIPTION

1. GENERAL.

a. PURPOSE. — Radio Transmitting Equipment AN/CRN-1 is a single-tube, battery-powered, low-frequency buoy transmitter, normally launched into the water from the bottom hatch of bombardment-type aircraft. A 6-foot baseball-type parachute is used to lower the equipment safely from the aircraft to the water. The equipment provides for automatic transmission of a predetermined signal suitable for homing purposes, to be used by aircraft equipped with Radio Compass SCR-269-(*).*

b. TRANSMISSION.

(1) GENERAL.—A vertically-polarized, non-directional C-W signal is transmitted in the frequency range of 1400 to 1750 kc. The transmitted signal consists of a C-W signal keyed at the rate of 180 times a minute and interrupted every 30 seconds by a single code letter which may be either M, Q, X, K, O, or Y. The code letter transmtted must be selected prior to the installation of the battery pack in the equipment. The condition of the battery and atmospheric conditions will determine the strength and range of the signal, which may normally be picked up over at least 50 miles of open sea.

(2) PERIOD.—The transmission period is approximately 12 hours in length, after which the signal strength will usually drop to an unusable level due to the discharge of the battery pack. Before launching the equipment, a timing knob, located at the top of the transmitter case, is set. Approximately 10 minutes to 12 hours after launching, this knob turns on the transmission for the regular transmission period. A soluble sink plug located at the top of the transmitter case will cause the transmitter to sink after 50 to 60 hours in the water.

c. AIR VALVE.—The air valve (see fig. 8) is installed primarily for manufacturing tests. Should any question

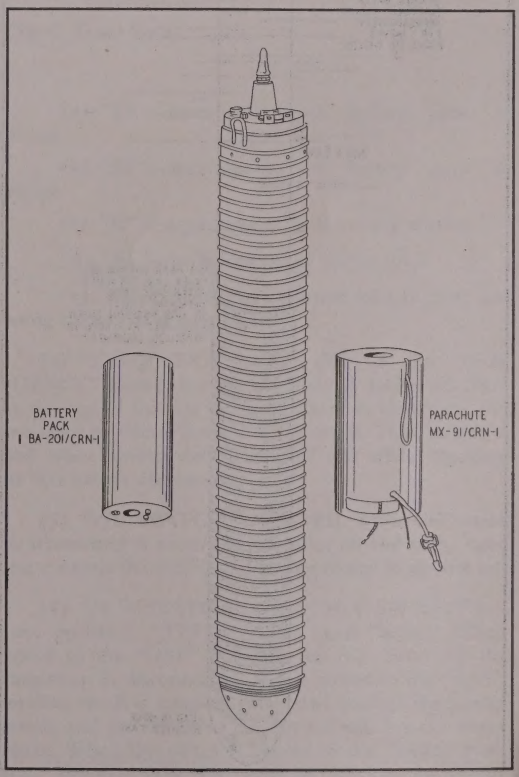

Figure 1—Radio Transmitting Equipment AN/CRN-1

* Asterisk in parentheses indicates any production model of this radio may be used.

arise concerning the condition of the inner transmitter case, the case may be filled with air and immersed in water. Any leaks in the case will be immediately indicated by bubbles rising to the surface.

2. COMPONENTS, DIMENSIONS, AND WEIGHTS.

a. EQUIPMENT SUPPLIED.—The components supplied with this equipment are listed below:

Quantity	*Name of Unit*	*Overall Dimensions in Inches*	*Wt. in Lbs.*
1	Radio Transmitter T2/CRN-1 with one tube JAN-6V6GT (VT-107-A) installed in socket	48½ high x 7⅛ diam.	33½
1	Parachute MX-91/CRN-1	11¼ high x 6½ diam.	4
	* Test Set TS-41/CRN-1 (including test stand)	9¾ x 8¼ x 11 30x30x40—erected 30x73—collapsed	15 25

* It is necessary to have one Test Set TS-41/CRN-1 in good operating condition at each home base.

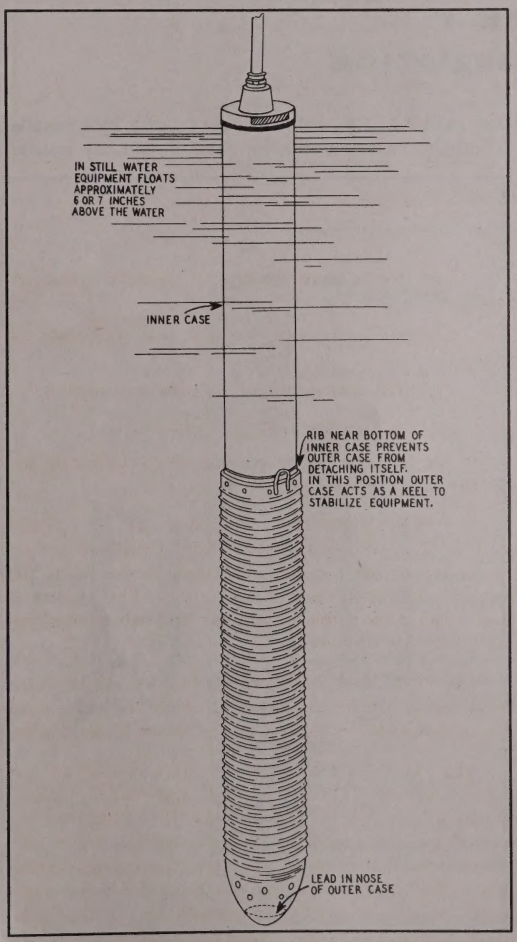
IN STILL WATER EQUIPMENT FLOATS APPROXIMATELY 6 OR 7 INCHES ABOVE THE WATER
INNER CASE
RIB NEAR BOTTOM OF INNER CASE PREVENTS OUTER CASE FROM DETACHING ITSELF. IN THIS POSITION OUTER CASE ACTS AS A KEEL TO STABILIZE EQUIPMENT.
LEAD IN NOSE OF OUTER CASE

Figure 2—Equipment in Water

b. EQUIPMENT REQUIRED BUT NOT SUPPLIED.—In addition to the equipment supplied, one Battery Pack BA-201/CRN-1 is required. This battery pack, 13.625 inches long and 5.687 inches in diameter, has an A section (9 volts) and a B section (675 volts).

3. PHYSICAL DESCRIPTION OF OPERATING EQUIPMENT.

Two telescoping steel cylinder cases house the equipment. (See fig. 1.) After the buoy is in the water, the outer case will lower and act as a keel to stabilize the equipment as shown in figure 2. The upper portion of the inner case is painted yellow so that it may be identified more easily when in the water. The inner case houses the transmitter. Space for the battery pack, which is housed in a cylindrical container, is provided at the bottom of the inner transmitter case. A hole in the battery pack allows it to be placed over the antenna, ballistic tube, and battery cable. At the top is the antenna insulator around which are grouped the operating controls, test sockets, and sink plug. Two tuning controls and the two test sockets are located under the control knob cover. (See fig. 8.) A hole through the center of the parachute pack allows it to be mounted over the antenna insulator on top of the inner transmitter case. The bottom of the parachute pack fits over the inner transmitter case and is secured by means of metal clamps.

4. POWER REQUIREMENTS.

Battery Pack BA-201/CRN-1 supplies the operating voltage to the oscillator circuit and the timing motor. The battery pack contains a 9-volt A supply for filament and motor operation and a 675-volt B supply for the plate and screen voltages of the oscillator tube.

5. TEST SET TS-41/CRN-1.

a. GENERAL.—Test Set TS-41/CRN-1 is used to service and maintain Radio Transmitting Equipment AN/CRN-1. The test set consists of a stand for the transmitter and a metal cabinet for housing the electrical components. A shielded cable, having both a five-prong and a single-prong plug, is attached to the test unit and connects to sockets on the top of the transmitter case. For test purposes there is at the top of the cabinet an insulator and a 12-inch bare wire conductor provided with a clip. A synchronous motor identical to that used in the transmitter is incorporated in the test set so that the keying of the transmitter may be duplicated for test purposes.

b. TUNING SHAFT.—A 3½-foot tuning shaft is provided with each test set. See figure 6. A hex fitting at the end of the shaft fits over the tuning rods on the transmitter case and permits the adjustments of the grid and plate circuits of the transmitter. Use the tuning shaft

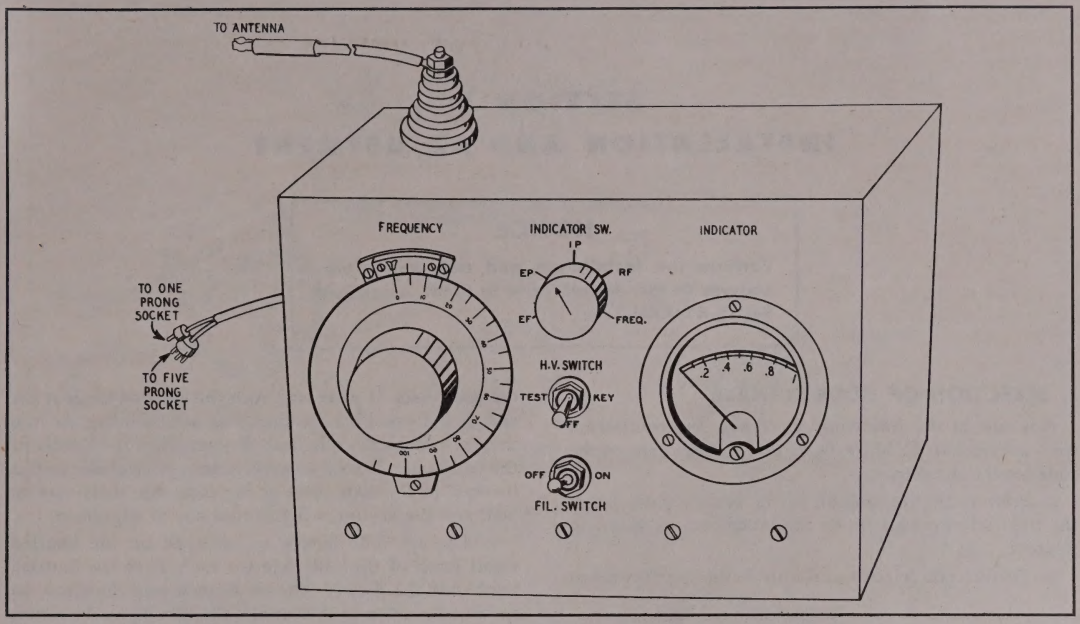

Figure 3—Test Set TS-41/CRN-1, Front View

when adjusting the transmitter, as accurate adjustment is impossible when the operator is too close to the transmitter antenna.

c. CODE SELECTOR TOOL.—The code selector tool provided with each test set is required to select the code letter transmitted by the equipment. (See fig. 4.) This tool is approximately 2 feet long and terminates at one end in a wooden handle and a small metal knurled knob. The other end has a positioning shaft and a rotating key that fits into a slot in the code disc hub. The small knurled knob has six letters (K, M, O, Q, X, and Y) stamped on it, any one of which may be selected for transmission. When the code selector tool is correctly inserted, the transmitter may be adjusted to transmit the desired letter by simply turning the knurled knob clockwise until the selected letter is aligned with the arrow on the wooden handle.

d. POWER SUPPLY CONNECTIONS.—Test Set TS-41/CRN-1, when used with Radio Transmitting Equipment AN/CRN-1, is a complete unit and requires no alternating current or battery power supply.

e. CONTROLS.—All controls are located on the front panel as shown in figure 3. The identification and purpose of each is as follows:

(1) "INDICATOR SW."—The indicator switch connects the meter to any one of five desired circuits. The switch positions and the function of the meter for each position are as follows:

(a) "EF"—measurement of battery pack A voltage.

(b) "EP"—measurement of battery pack B voltage.

(c) "IP"—measurement of B battery current.

(d) "RF"—measurement of output level.

(e) "FREQ"—tuning indicator for adjusting the tuning circuits of the transmitter.

(2) "FREQUENCY."—The dial of the "FREQUENCY" control has a 0-100 scale. A calibrated chart on the top of the test set is necessary to determine the frequency to which the test set is tuned. This control is used when tuning the transmitter and when checking the transmitter frequency.

(3) "FIL. SWITCH."—The "FIL. SWITCH" turns the transmitter A battery circuit on or off and at the same time controls the timing and keying motor in the test set.

(4) "H. V. SWITCH."— The "H. V. SWITCH" has three positions, "TEST," "OFF," and "KEY." When turned to the "OFF" position, the B+ circuit of the transmitter is disconnected. When turned to the "KEY" position, the B+ circuit is completed through the keying switch, and the motor in the test set will key the transmitter. When the switch is turned to the "TEST" position, "INDICATOR SW" may be tuned to any of the five positions and the desired readings taken.

SECTION II
INSTALLATION AND ADJUSTMENT

NOTICE

Perform the installation and adjustment procedures in this section prior to flight, using Test Set TS-41/CRN-1.

1. SELECTION OF CODE SIGNALS.

Any one of the following six letters may be selected for transmission: K, M, O, Q, X, and Y. Select one of the code letters as follows:

a. Prior to the installation of the battery pack, insert the code selector tool inside the inner case as shown in figure 4.

b. Fit the code selector tool into the holes provided in the code discs. If necessary, turn the knurled knob at the end of the wood handle clockwise until the key fits into the slot provided on the hub. Do not allow the handle of the code selector tool to move sideways after the tool is inserted in the code discs or the code disc shaft may be bent and the keying switch forced out of alignment.

c. The six code letters are stamped on the knurled metal knob of the code selector tool. Turn the knurled knob until the desired letter is aligned with the arrow on the wood portion of the handle. The timing mechanism is now adjusted and the transmitter will repeat the selected code letter every 30 seconds during the 12-hour transmission period.

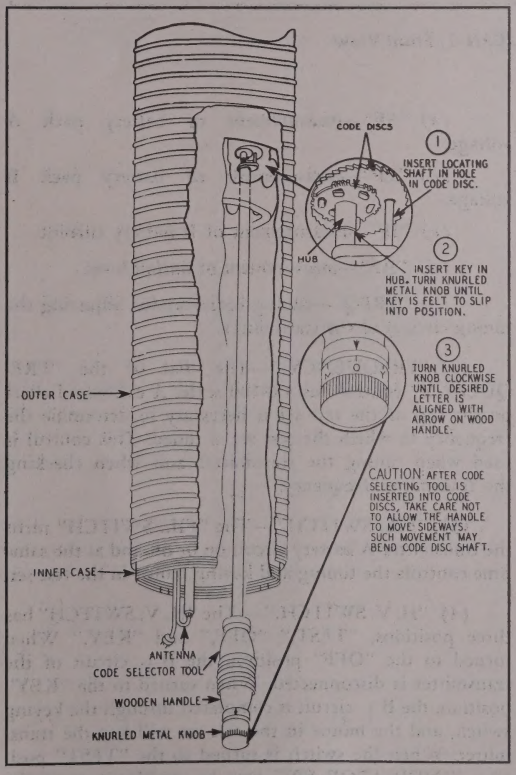
CODE DISCS
1
INSERT LOCATING SHAFT IN HOLE IN CODE DISC.
HUB
2
INSERT KEY IN HUB. TURN KNURLED METAL KNOB UNTIL KEY IS FELT TO SLIP INTO POSITION.
3
TURN KNURLED KNOB CLOCKWISE UNTIL DESIRED LETTER IS ALIGNED WITH ARROW ON WOOD HANDLE.
OUTER CASE
CAUTION: AFTER CODE SELECTING TOOL IS INSERTED INTO CODE DISCS, TAKE CARE NOT TO ALLOW THE HANDLE TO MOVE SIDEWAYS. SUCH MOVEMENT MAY BEND CODE DISC SHAFT.
INNER CASE
ANTENNA
CODE SELECTOR TOOL
WOODEN HANDLE
KNURLED METAL KNOB

Figure 4—Selection of Code Letter

2. INSTALLATION OF BATTERY PACK.

WARNING

The battery pack contains high voltage (approximately 675 volts). Take care not to contact the battery cable socket or connections when installing the battery pack.

Prior to the operating test and the installation of the parachute, install Battery Pack BA-201/CRN-1 as described below. See figure 5.

a. Unscrew and remove the nose end of both the outer and inner cases.

b. Remove the cardboard filler and the round wood spacer from the inner case.

c. Place the battery pack over the antenna. The battery cable socket on the battery pack must be at the bottom of the equipment.

d. Push the battery pack into the case as far as it will go.

e. Insert the plug located on the battery cable into the sockets on the battery pack.

f. Remove the airtight container from the nose of the inner case. Wrap the bag containing Silica Gel around the antenna and tie securely in place, discarding the container.

g. Place the round wood spacer inside the inner case with the rubber side towards the battery pack.

h. Place the spacer so that the indentations in the wood are opposite the tabs on the inner transmitter case.

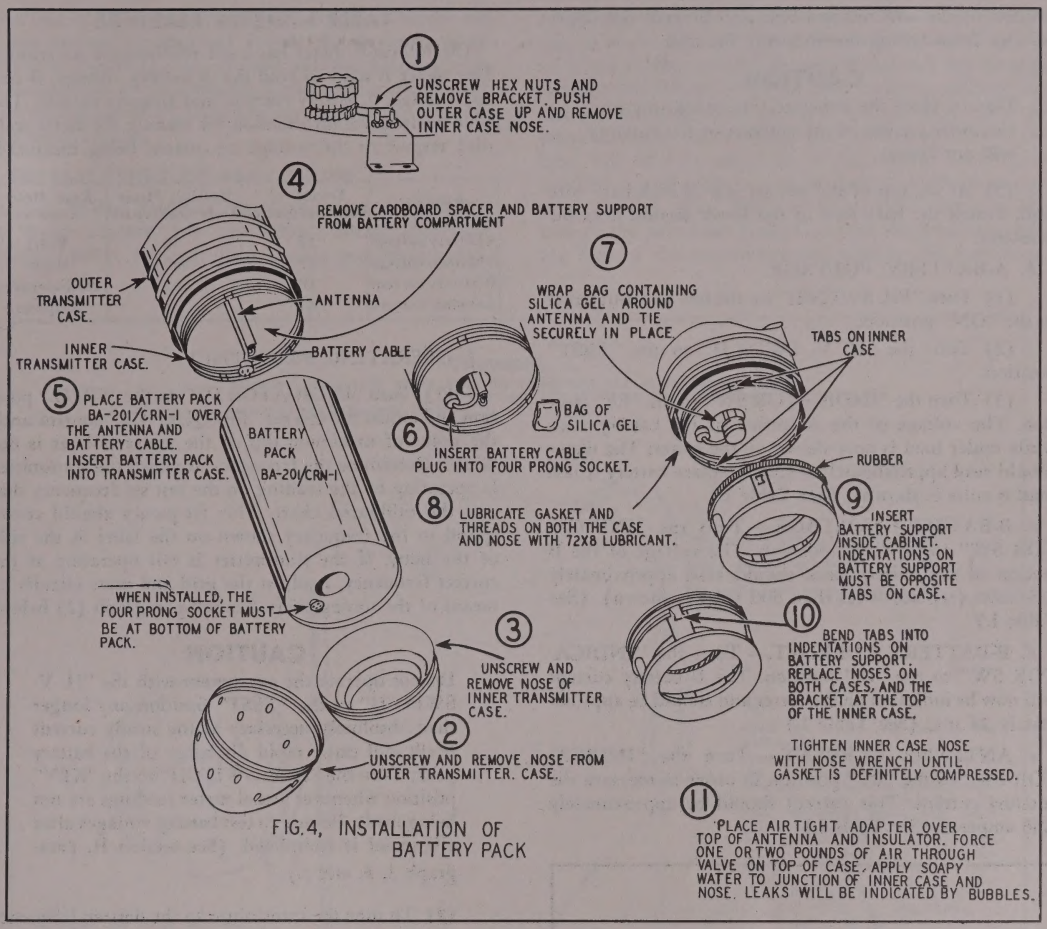
1
UNSCREW HEX NUTS AND REMOVE BRACKET. PUSH OUTER CASE UP AND REMOVE INNER CASE NOSE.
4
REMOVE CARDBOARD SPACER AND BATTERY SUPPORT FROM BATTERY COMPARTMENT
OUTER TRANSMITTER CASE.
ANTENNA
INNER TRANSMITTER CASE.
BATTERY CABLE
7
WRAP BAG CONTAINING SILICA GEL AROUND ANTENNA AND TIE SECURELY IN PLACE.
TABS ON INNER CASE
5
PLACE BATTERY PACK BA-201/CRN-1 OVER THE ANTENNA AND BATTERY CABLE. INSERT BATTERY PACK INTO TRANSMITTER CASE.
BATTERY PACK BA-201/CRN-1
6
INSERT BATTERY CABLE PLUG INTO FOUR PRONG SOCKET.
BAG OF SILICA GEL
RUBBER
8
LUBRICATE GASKET AND THREADS ON BOTH THE CASE AND NOSE WITH 72X8 LUBRICANT.
9
INSERT BATTERY SUPPORT INSIDE CABINET. INDENTATIONS ON BATTERY SUPPORT MUST BE OPPOSITE TABS ON CASE.
WHEN INSTALLED, THE FOUR PRONG SOCKET MUST BE AT BOTTOM OF BATTERY PACK.
3
UNSCREW AND REMOVE NOSE OF INNER TRANSMITTER CASE.
10
BEND TABS INTO INDENTATIONS ON BATTERY SUPPORT. REPLACE NOSES ON BOTH CASES, AND THE BRACKET AT THE TOP OF THE INNER CASE.
2
UNSCREW AND REMOVE NOSE FROM OUTER TRANSMITTER. CASE.
TIGHTEN INNER CASE NOSE WITH NOSE WRENCH UNTIL GASKET IS DEFINITELY COMPRESSED.
11
PLACE AIRTIGHT ADAPTER OVER TOP OF ANTENNA AND INSULATOR. FORCE ONE OR TWO POUNDS OF AIR THROUGH VALVE ON TOP OF CASE. APPLY SOAPY WATER TO JUNCTION OF INNER CASE AND NOSE. LEAKS WILL BE INDICATED BY BUBBLES.

FIG. 4, INSTALLATION OF BATTERY PACK

Figure 5—Battery Pack BA-201/CRN-1, Installation

i. Bend the tabs on the inner case over to hold the wood spacer securely. Lubricate the gasket and the threads on both the inner case and the nose with 72 x 8 lubricant.

j. Replace the nose on the inner case. Use the nose tool and tighten the nose with considerable force until the gasket is definitely depressed. Slide the inner case up and replace the float cord bracket and the nose on the outer case.

3. OPERATING TEST.

Immediately before loading the transmitter into the aircraft check that all circuits are functioning properly. Use Test Set TS-41/CRN-1 for this inspection. (See fig. 3.) To make the test, proceed as follows:

CAUTION

Always make certain that "FIL SW" and the "H. V. SWITCH" on the test set are turned to the "OFF" position before connecting the test set to a transmitter. Take care not to contact the antenna on the transmitter or the bare wire lead at the top of the test set while the "FIL. SW" and the "H. V. SWITCH" are turned to other than the "OFF" positions.

a. PROCEDURE.

(1) Place the transmitter in the test set stand.

(2) Loosen the two thumbscrews at the top of the transmitter and remove the control knob cover.

(3) Connect both the five-prong plug on the end of the test equipment cable and the single-prong, high-voltage plug to the sockets on the top of the transmitter case. (See figure 8.)

(4) Remove the rubber finger stall cap (not shown in sketch) from collapsed antenna and retaining collar. Raise the lower antenna section as far as possible. Jerk the lower antenna section slightly as it reaches the extreme point of extension in order to secure it in position. This will insure good electrical contact with the fixed

portion of the antenna and will also prevent the upper sections from falling down during the test.

CAUTION

Do not force the lower section too firmly into the inner section of the antenna or the antenna will not lower.

(5) At the top of the test set is a 12-inch bare wire lead. Fasten the bare lead to the lower section near the insulator.

b. A-BATTERY VOLTAGE.

(1) Turn "FIL SWITCH" on the test set front panel to the "ON" position.

(2) Turn the "H. V. SWITCH" to the "TEST" position.

(3) Turn the "INDICATOR SW" to the "EF" position. The voltage of the A section of the battery pack while under load is now shown on the meter. The meter should read approximately 9 volts (replace battery if less than 8 volts is shown). (See Table I.)

c. B-BATTERY VOLTAGE.— Turn the "INDICATOR SW" to the "EP" position. The voltage of the B section of the battery pack should read approximately 675 volts (replace if les than 600 volts is shown). (See Table I.)

d. B-BATTERY CURRENT.— Turn the "INDICATOR SW" to the "IP" position. The B battery current will now be indicated on the meter and should be approximately 24 ma. (See Table I.)

e. ANTENNA CURRENT.— Turn the "INDICATOR SW" to the "RF" position in order to measure the antenna current. This current should be approximately 0.66 amperes. (See Table I.)

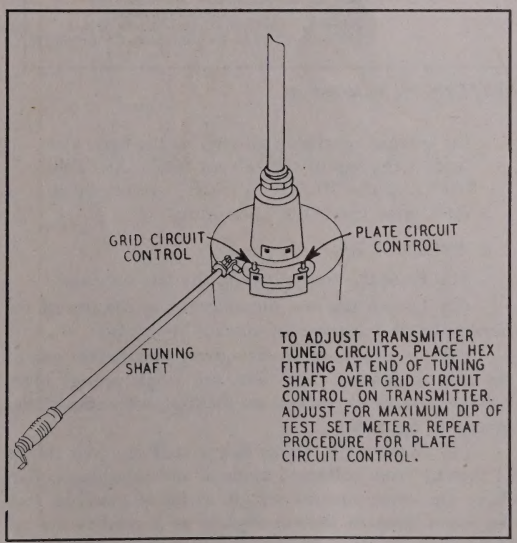
GRID CIRCUIT CONTROL
PLATE CIRCUIT CONTROL
TUNING SHAFT
TO ADJUST TRANSMITTER TUNED CIRCUITS, PLACE HEX FITTING AT END OF TUNING SHAFT OVER GRID CIRCUIT CONTROL ON TRANSMITTER. ADJUST FOR MAXIMUM DIP OF TEST SET METER. REPEAT PROCEDURE FOR PLATE CIRCUIT CONTROL.

Figure 6—Use of Tuning Shaft

TABLE I—METER READINGS

The indicator meter has a 0-1 milliampere movement. This meter is used to read the A battery voltage, B battery voltage, B battery current, and antenna current. The table below gives information for reading the meter scale with respect to the voltage or current being measured.

Reading	*Setting of Indicator Switch*	*Multiply Meter Scale Reading by*	*Read Meter Scale as*
A battery voltage	"EF"	10	Volts
B battery voltage	"EP"	1000	Volts
B battery current	"IP"	100	Milliamperes
Antenna current	"RF"	1	Amperes

f. OPERATING FREQUENCY.

(1) Turn "INDICATOR SW" to the "FREQ." position and adjust the test set "FREQUENCY" control until the point of maximum dip of the meter pointer is obtained. Determine the frequency at which the transmitter is operating by the reading on the test set frequency dial and the calibrated chart. This frequency should correspond to the frequency shown on the label at the side of the buoy. If the transmitter is not operating at the correct frequency, readjust the grid and plate circuits by means of the tuning shaft. See sub-paragraph (2) below.

CAUTION

Do not operate the equipment with the "H. V. SWITCH" in the "TEST" position any longer than absolutely necessary as the steady current drain will cause rapid discharge of the battery pack. Turn the "H. V. SWITCH" to the "KEY" position whenever actual meter readings are not being made. Be sure to test battery voltages after alignment is completed. (See section II, paragraph 3, *b.* and *c.*)

(2) To tune the transmitter to the desired frequency (see fig. 6) proceed as follows: If the actual frequency of the transmitter is far from the desired frequency (see (1) above), adjust the "FREQUENCY" control to the desired frequency and roughly tune the transmitter by observing the fluctuating meter reading. When the transmitter frequency is tuned close to the desired frequency, turn the "H. V. SWITCH" to the "TEST" position and adjust the transmitter controls carefully for maximum meter dip.

Note

In the event that improper voltage or current readings are obtained or if it is impossible to adjust tuned circuits for proper output level, disconnect the test set from the transmitter and disassemble the transmitter for service.

g. RUBBER FINGER STALL.— After measurements have been completed, disconnect the test unit from the buoy. Carefully collapse the top sections of the antenna and replace the rubber finger stall. Make sure that the

open end of the rubber is snapped over the circular rib on the antenna retainer nut. *Install this finger properly since it prevents the entry of water into the antenna prior to the erection of the antenna.* Replace the control cover plate on the top of the buoy and securely tighten the two hold-down clamps.

4. INSTALLATION OF PARACHUTE.

After Radio Transmitting Equipment AN/CRN-1 has been checked for operation, install Parachute MX-91/CRN-1. Figure 7 illustrates the procedure to follow in installing the parachute pack. When this installation is made, take care that the cords connected to the pull-switch loop and the float-cord loop are not tangled with the mechanism. Pull the braid sleeving on both the red and the black cords down over the hooks. Place the parachute pack on the transmitter so that cut-outs in the base will fit over the ends of the control knob cover brackets as well as the bracket on the side of the inner case near the sink plug. Securely tighten the clamp at the base of the parachute pack to prevent the parachute falling free of the transmitter and fouling the load lines.

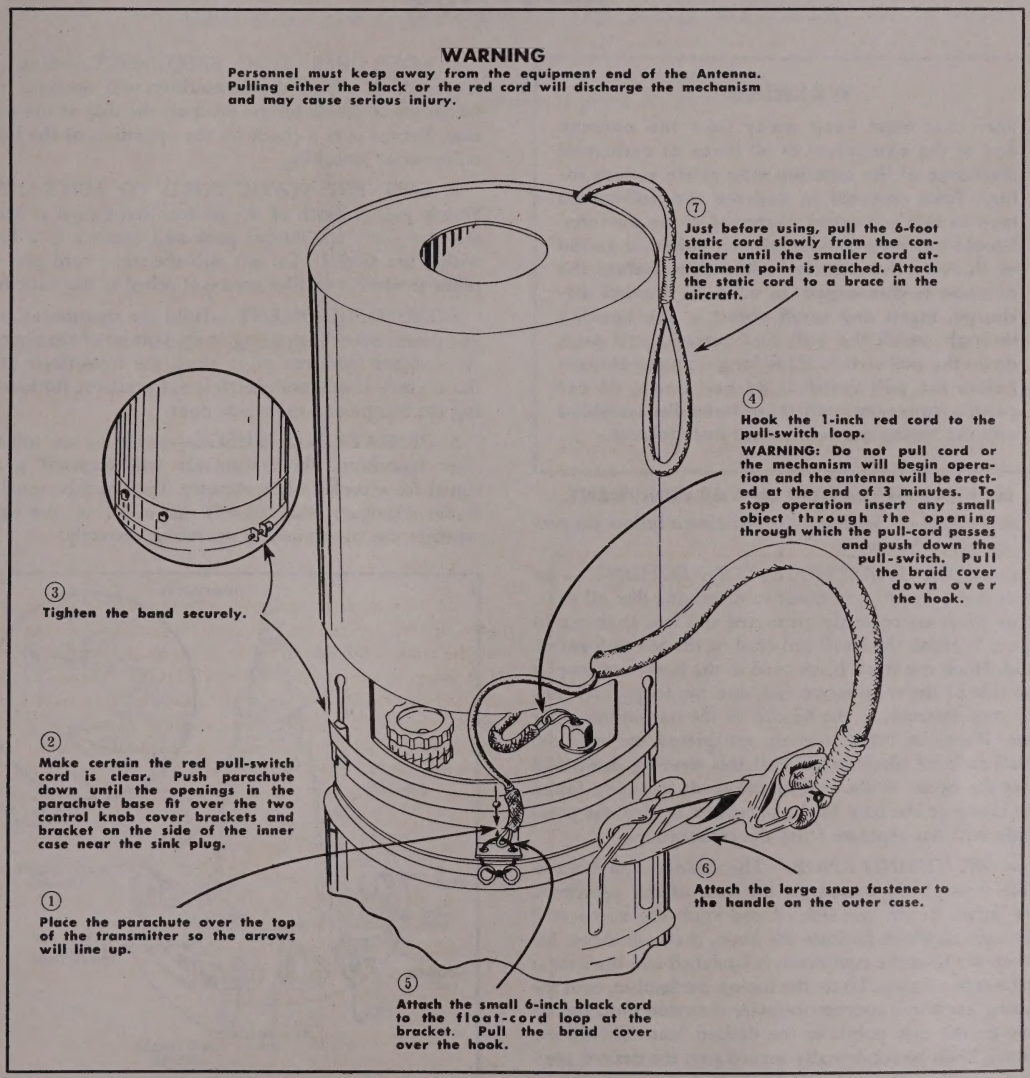
WARNING
Personnel must keep away from the equipment end of the Antenna. Pulling either the black or the red cord will discharge the mechanism and may cause serious injury.
⑦ Just before using, pull the 6-foot static cord slowly from the container until the smaller cord attachment point is reached. Attach the static cord to a brace in the aircraft.
④ Hook the 1-inch red cord to the pull-switch loop.
WARNING: Do not pull cord or the mechanism will begin operation and the antenna will be erected at the end of 3 minutes. To stop operation insert any small object through the opening through which the pull-cord passes and push down the pull-switch. Pull the braid cover down over the hook.
③ Tighten the band securely.
② Make certain the red pull-switch cord is clear. Push parachute down until the openings in the parachute base fit over the two control knob cover brackets and bracket on the side of the inner case near the sink plug.
① Place the parachute over the top of the transmitter so the arrows will line up.
⑥ Attach the large snap fastener to the handle on the outer case.
⑤ Attach the small 6-inch black cord to the float-cord loop at the bracket. Pull the braid cover over the hook.

Figure 7—Parachute MX-91/CRN-1, Installation

WARNING

Do not pull the red pull-switch loop at any time. Operation of the timing mechanism and the consequent firing of the blank cartridge will result if this loop is pulled.

5. INSTALLATION OF EQUIPMENT IN AIRCRAFT.

Stow Radio Transmitting Equipment AN/CRN-1 in the aircraft fuselage where it will be readily accessible at the time of launching and in a position to minimize the possibility of injuring personnel due to accidental discharge of the antenna.

SECTION III
OPERATION

WARNING

Personnel must keep away from the antenna end of the equipment at all times as accidental discharge of the antenna may cause serious injury. Take care not to pull the red pull-switch loop as this will cause discharge of the antenna. Should this loop accidentally be pulled, a period of three to five minutes will elapse before the antenna is discharged. In order to prevent discharge, insert any small object in the opening through which the pull cord passes, and push down the pull switch. If too long a period elapses before the pull switch is pushed down, do not use the transmitter until it has been disassembled and the timing mechanism set back to zero.

1. MANUAL OPERATION OF THE EQUIPMENT.

At the time of launching the equipment follow the procedure given below.

a. CHECK PARACHUTE CONNECTIONS. — Inspect the transmitter in order to determine that all parachute cords are correctly connected and free as shown in figure 7. Hook the small red cord to the red pull-switch loop. Hook the small black cord to the float-cord loop at the side of the transmitter case, and the large cord with the snap fastener, to the handle on the transmitter outer case. Pieces of braid sleeving are placed on both the small red and black cords. Pull this sleeving down and over the hooks at the end of the cords. Securely fasten the clamp at the base of the parachute so that the parachute will not separate from the transmitter.

b. SET TIMING KNOB.—The timing knob is accessible through the cut-out at the base of the parachute. See figure 8. On the side of the knob are numbers 0 through 12 which indicate the hours that will elapse between the time the equipment is launched and the time it starts transmitting. To set the timing mechanism, turn the timing knob in a counterclockwise direction until the arrow on the case points to the desired hour. Should the timing knob be accidentally turned past the desired position, continue to rotate the knob in a counterclockwise direction until the desired position is again reached.

c. NOTE OPERATING FREQUENCY. —Note the frequency at which the transmitter will operate. This frequency is shown on the label on the side of the outer case. Record it as a check on the operation of the transmitter after launching.

d. CONNECT STATIC CORD TO AIRCRAFT.—Slowly pull as much of the six-foot static cord as necessary from the transmitter pack and connect to a brace within the aircraft. Do not pull the static cord past the point at which a smaller cord is attached to the static line.

e. DROP EQUIPMENT.—Hold the transmitter, nose end down, over the opening in the bottom of the aircraft. At a signal from the pilot, drop the transmitter from the aircraft. If a bottom hatch is not available for launching the equipment, use a side door.

f. OPERATIONAL CHECK.—Seven to ten minutes after launching, the transmitter will transmit a test signal for a period of 10 minutes. Tune in this signal on Radio Compass SCR-269-(*) in order to determine whether the transmitter is operating correctly.

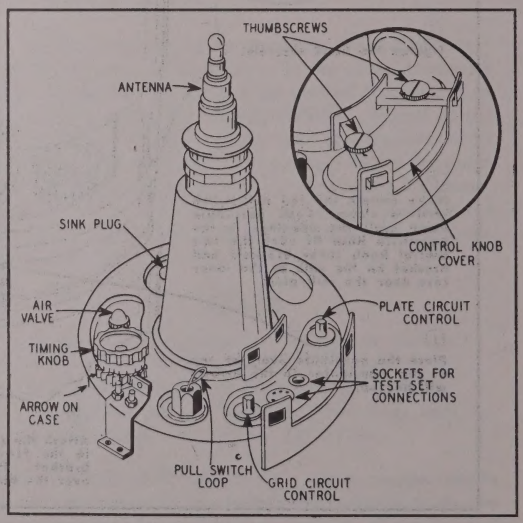

Figure 8—Position of Controls

Note

If the transmitter fails to operate during the 10-minute operational check period and additional units are available, launch another unit. Be sure to perform all the steps listed in paragraph 1.*a.-f.* of this section.

SECTION IV
EMERGENCY OPERATION AND REPAIR

1. Due to the nature of operation of this equipment, no emergency operation or repair is required during flight.